NASA Facts ON LINE

AMES RESEARCH CENTER

National Aeronautics and Space Administration

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CENTER OF EXCELLENCE FOR INFORMATION TECHNOLOGY (CoE-IT)

In contributing to NASA and America's goals, Ames Research Center has been designated as the agency's Center of Excellence for Information Technology. In that capacity, Ames' vision is to ensure the development of technologies applicable throughout NASA and elsewhere that enable the Information Age -- that expand the frontiers of knowledge for aeronautics and space, improve America's competitive position, accelerate America's emerging information revolution and inspire future generations.

To that end, Ames is committed to designing, developing and delivering integrated information systems technologies and applications by leading and coordinating agencywide research in the fields of networking, artificial intelligence, supercomputing, numerical computing software and human factors.

Ames' Plans to Implement NASA's CoE-IT

Advanced **Information Technology (IT)** is the key to providing revolutionary solutions to the challenges posed by the increasing complexity of NASA's aeronautics and space missions and the sophisticated nature of the systems that enable them. According to Administrator Daniel S. Goldin, IT is the single element that is most vital to the success of NASA's missions in the 21st century.

Information technology may be defined as the use of advanced computing systems to analyze data, transforming it into knowledge that can be displayed in visual, virtual and multimedia environments to aid in the scientific decision-making process. IT systems 'learn' as they go, developing the capability to make decisions on the basis of 'experience' using limited data inputs. In the future, information technologies may aid damaged aircraft to land safely by 'knowing' what adjustments to make automatically, perform robotic surgery, and monitor the health and

status of spacecraft and planetary probes.

To reap the benefits of incorporating information technologies within all of the agency's aeronautics and space programs, NASA has established the CoE-IT at Ames Research Center. Its purpose is to foster innovative IT research and development by partnerships of NASA centers, other Government facilities, industry and academia.

While the CoE-IT operates as a 'virtual' organization, Ames is leading this NASA effort in pursuit of revolutionary, IT-based approaches to aeronautics and space requirements. The objective is to incorporate information technologies within each of the agency's four Enterprises to reduce cost and enhance mission capability.

To date, Ames has identified new technologies in seven fundamental discipline-based research areas as being 'enabling' -- critical to support the future needs of NASA's Strategic Enterprises. They include: modeling and simulation, database and information management, human/computer interaction, automated intelligent decision making, smart sensor systems, software technology, and high performance computing, networking, and storage.

In addition, Ames has delineated five distinct technology applications focus areas as the drivers of CoE-IT requirements.

In the **Integrated Design Systems** focus area, new IT systems are being developed to accommodate globally distributed and increasingly complex design-team interrelationships. They will provide in-depth knowledge for cost-effective early design decisions and will expedite aerospace products to market. This will reduce costs for American aerospace manufacturers and expand their market share. New space missions will be made possible as insertion of focused information technologies significantly reduces both risk and life-cycle costs.

In **Aviation Operations**, IT systems will have many capabilities, including providing up-to-the-minute information about weather and aircraft position, and optimizing route selection. Their use will enhance flight safety while simultaneously improving the operational efficiency of the American air transportation system.

The use of information technologies in **Space Systems Operations** will lead to dramatic reductions in launch and operational costs of space flight systems for orbiting and exploration platforms. This will permit an increase in the number of concurrently operating missions which will be accomplished in less time and with a higher degree of safety.

For future space missions, information technologies related to **Autonomous Systems for Space Flight** will enable smaller, more frequent and intensive space exploration at much lower costs without a substantial decrease in mission reliability, capability or return on science investment. Advances in IT will permit spacecraft to work in teams without human intervention. Special software and tiny on-board computers will enable planetary probes to be so small and intelligent that several may be sent on any given exploratory mission.

The challenge in **the Large-Scale Information Management and** Simulation technology focus area is to use IT systems to manage increasingly vast data sets, converting them to information that can be accessed rapidly and securely for scientific and educational purposes. High-capacity data dissemination and large-scale data storage and retrieval will enhance data access and utility. This will make it possible to both model and make predictions about the Earth's complex, interactive systems and human-induced changes in response to Mission to Planet Earth requirements.

Ames is implementing the CoE-IT by capitalizing on existing information technology programs in-house and throughout the agency. In addition, innovative staffing and operational tools are redefining paradigms and ushering in the information technology era.

For further information, contact

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